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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/002,178	12/31/1997	MARK T. BOHR	042390P4220	7527

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EXAMINER

GUERRERO, MARIA F

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 10/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/002,178

Applicant(s)

BOHR, MARK T.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 31-43 and 45-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 31-43 and 45-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. This Office Action is in response to the Request for continued examination filed September 30, 2002.

Claims 1-30, 44 are canceled.

Claims 31-43 and 45-54 are pending.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 30, 2002 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 31-43 and 45-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Efland et al. (U.S. 6,025,275) and Byrne (U.S. 5,136,364) in view of Lou (U.S. 5,759,906).

Regarding claims 31-43 and 45-54, Efland et al. teaches forming a dielectric layer 22 over a metal layer on a substrate, the metal layer including a bond pad and a metal member space apart from the bond pad by a gap (fig. 1A), the dielectric layer 22 may be composed of several layers of dielectric having different makeup, the dielectric layer 22 may be composed by several layers (oxide, nitride, or polyimides) (col. 3, lines 40-45, col. 5, lines 25-30).

Efland et al. also discloses forming an opening (fig. 1A). Efland et al. teaches forming a conducting barrier layer 30 over the dielectric layer, over sidewalls of the opening, and over the exposed top surface of the bond pad (fig. 1B, the formation of a continuous seal is inhered). Furthermore, Efland et al. shows an electroplating process to form a copper lead 50 (fig. 1C, col. 5, lines 30-40).

Efland et al. does not specifically show the formation of first, second, and third material. However, Efland et al. teaches the dielectric layer 22 may be composed by several layers (oxide, nitride, or polyimides) (col. 3, lines 40-45, col. 5, lines 25-30). In addition, Byrne '364 shows the formation of the material to prevent moisture penetration (col. 2, lines 45-65).

Efland et al. fails to show forming the fourth material comprising an upper 4,000 Angstroms thick nickel vanadium film. However, this is known in the art as evidenced Byrne '364.

Byrne '364 discloses forming: a substrate 10, a bonding pad 11, a two component passivation layer, a first dielectric layer (silicon dioxide), a second dielectric layer (silicon nitride), a third dielectric layer can be a polyimide layer (fig. 3-5, col. 2,

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lines 60-65, col. 3, lines 1-35). Byrne '364 also teaches forming an opening to exposed the top surface of the bonding pad, depositing a barrier layer (fig. 3). Byrne '364 discloses typically bumps are connected to the bonds pads. Byrne '364 also discloses a barrier layer comprising a nickel-vanadium layer (col. 2, lines 40-43). Furthermore, Byrne '364 discloses the formation of the bump as well known in the art (col. 1, lines 10-25).

Efland et al. and Byrne '364 fails to show the second material being kept out of the gap, the first material being doped with fluorine atoms. However, Lou teaches forming the fluorine-doped silicon oxide to fill the gap in order to reduce the capacitance between lines. Lou also shows forming the second material being kept out of the gap (Abstract, fig. 4-6, 9, col. 1, lines 60-67, col. 2, lines 5-10).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Efland et al. and Byrne's process by including the Lou's teachings. The modification would provide an interconnection having reduced capacitance between lines and having a seal that would exclude contaminants from the critical parts (Byrne, col. 1, lines 48-51, Lou, Abstract).

Response to Arguments

4. Applicant's arguments filed September 30, 2002 have been fully considered but they are not persuasive. Claims 31-43 and 45-54 stand rejected.

Applicant argued that Lou does not teach completely filling the gap with the first material having a low dielectric constant, and the fist material being doped with fluorine atoms. However, Lou has been cited to show that the second material being kept out of

the gap and the first material being doped with fluorine atoms is known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Efland et al. and Byrne's process by including the Lou's teachings in order to reduced capacitance between lines.

Furthermore, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

5. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued

examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 703-305-0162.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

MG
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October 18, 2002



AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800